EOSAEL and PcEosael©

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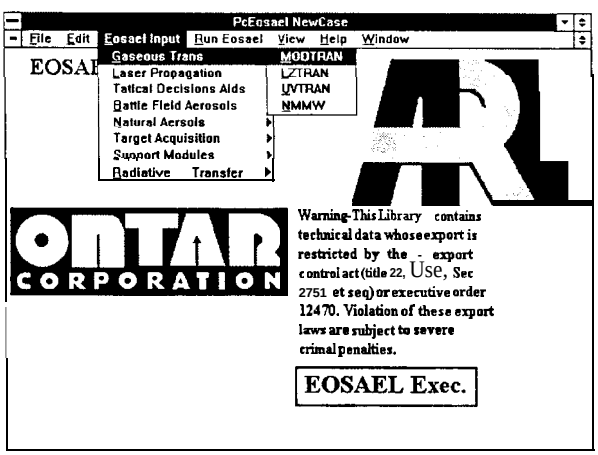
This work is implementing a Microsoft Windows™ interface for the Army Research Laboratory's family of EOSAEL modules under a Phase II SBIR Contract (DAAL01-96-C-2007). The work is sponsored by the Army Research Laboratory, Adelphi, MD and is being directed by Dr. Alan Wetmore of ARL. He can be contacted via e-mail at Awetmore@arl.mil, or via the World Wide Web at www.EOSAEL.com. This paper briefly described EOSAEL, PcEosael, current and future software development directions, and distribution of EOSAEL products. User can keep up to data on EOSAEL development through the web page www.EOSAEL.com.

The **EOSAEL is** a state-of-the-art computer library comprised of fast-running, theoretical, semiempirical, and empirical computer programs that mathematically describe aspects of electromagnetic propagation in a battlefield environments. The 25 modules are connected through an executive routine, but often are exercised individually. They may be categorized into eight generic atmospheric effects areas: atmospheric gases, laser propagation, tactical decision aids, battlefield aerosols, natural aerosols, target acquisition, support modules, and radiative transfer.

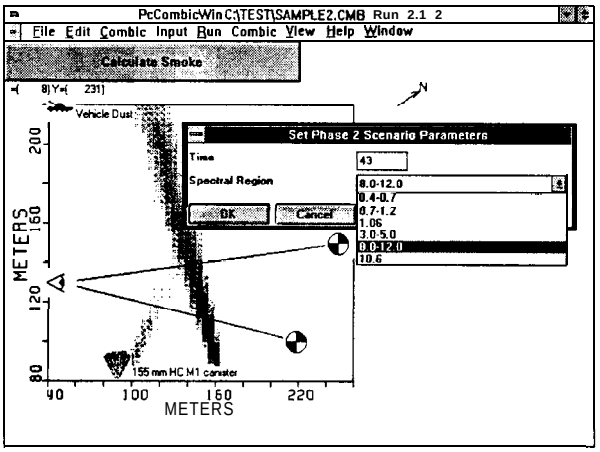
The EOSAEL modules and documentation are currently distributed to approved users through TECNET. Approval to access the system is obtained by contacting Dr. Wetmore at the addresses given above, The user may obtain, upon approval: The FORTRAN source code of the module, PC executable code for the module, the module manual in a PostScript™ format, and several test cases to insure the proper compiling and running of the module. Data input is accomplished by using a text editor to produce the appropriately formatted ASCII file, and output are given in ASCII tables. Several of the modules have limited graphical output files in an ASCII format.



PcEosael is Ontar's implementation of a user-friendly, Microsoft Windows based interface for the for each of the EOSAEL modules together with and overall executive to link them into a unified package as shown by the figure to the left. The work will be completed by the Spring of 1998.

The interface allows the user to set parameters by an intuitive, visual point

and click method, output plots of computed results, and generate images that are easily viewed. The interface is independent of the internal workings of the individual EOSAEL modules, and has on-line documentation for each of the modules and its suite of input parameters. It significantly simplifies setting scenario parameters common to all the modules (e.g. spectral band, range, etc.), and provides tools to easily compare the results from the different EOSAEL modules. "



An example of the GUI is shown in the figure to the left which is produced by the COMBIC module. COMBIC compute the transmission through dust clouds, smoke, fire and other man made obstructions. The figure shows an observer (the eyeball), two paths (the end point are designated by the circles), and two obscurant sources. The first is the dust generated by a moving vehicle which is designated by the tank symbol in the upper left corner of the screen. The second source is a smoke canister designated by the symbol at the bottom of the plot toward the left hand side. This visual representation is used to two purposes.

First, it allows the user to specify the location of the sources, and the end points of the paths for the calculation. The user can either click on the object, e.g. the eyeball, and bring up an input screen were he can input the numeric x-y values for the location, or he can click and drag the object on the screen to the desired location. Similarly he can add (or subtract) sources and other paths.

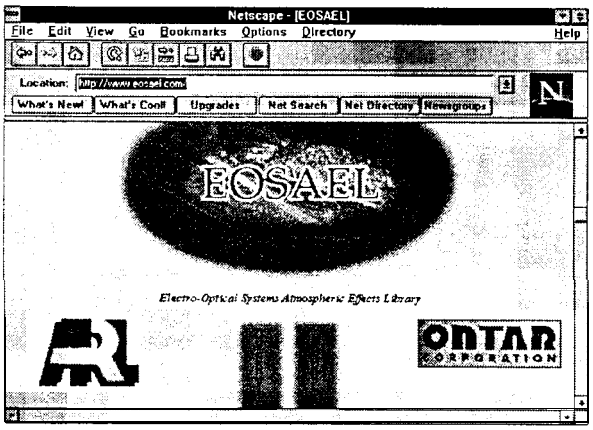
The second use of this GUI is to view the output from the COMBIC calculation. In this case we are showing the dissipation of the smoke cloud from the 155 mm canister at 43 seconds after the beginning of the scenario. The user does this by clicking on the horizontal bar near the top of the screen labeled **"Calculate Smoke"** which brings up the dialog box shown at the right of the figure. The user first specifies the time from the beginning of the scenario at which he wishes to view the cloud and the spectral band in which he wishes to see the results (in this example the 8 to 12 μm band). The result are shown, in this case, by the vertical strip running from the smoke canister at the bottom of the display area (near the 160 meter grid point) to the top of the screen. The dust from the moving vehicle has moved out of the viewing screen by 43 seconds. At an earlier both the smoke and dust clouds will be in the field of view.

The strip is a visual representation, projected onto a 2d plane, of the spatial extent and transmission of the smoke cloud at the time and in the spectral band specified by the user. In this case the display is at 43 seconds after the release for the .8 to 12 μm spectral region. The spatial extent is indicated by the x-y spread in the data. The transmission is

depicted as a gray scale going from black (0% transmission) to white (100% transmission). A second display, not shown, allows the user to generate a transmission plot (O to 100%) as a function of time along each of the paths shown in the display.

Similar GUI are available for the other EOSAEL module where it is appropriate to display the inputs and outputs in a graphical format.

The software is designed for cross platform use, and the Windows software will be followed by corresponding UNIX versions. All documentation, including the ARL/ASL scientific reports, ARL technical manual for each module, associated software manuals, and on-line help is in the Adobe Acrobat Portable Document Format™ (PDF). The documentation is used as either a stand along product to be read at your leisure, or in conjunction with operation the software via hyperlinks.



A second major objective of the work is to better keep user informed EOSAEL developments. The is being accomplished via the URL site www.EOSAEL.com. Requests for the access to TECNET can be sent via the web site which also contains a descriptions of each module and the interactions between the modules.

The complete PcEosael interface will be completed by the Spring of 1998. In the interim, beta versions of selected modules are available for testing. These can be obtained by contacting Dr. Wetmore.